DOCUMENT RESUME

ED 259 139 CE 041 809

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TITLE Selection of a Computerized Guidance System: A Review of DISCOVER and SIGI.
PUB DATE 1 Apr 85
NOTE 15p.; Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 1, 1985).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Career Education; *Career Guidance; College Programs; *Computer Oriented Programs; *Computer Software; *Evaluation Criteria; Higher Education; *Selection
IDENTIFIERS *DISCOVER System; *System of Interactive Guidance and Information

ABSTRACT

This paper reviews the process of selection of a computerized guidance system for a multicampus, heterogeneous college. The paper first describes the criteria for selecting a career guidance program appropriate for a particular student population. These selection criteria included content of the program, internal structure, hardware and cost, and training and support. In the next section, the paper describes the main features of the two systems that were considered for implementation: DISCOVER and SIGI (System of Interactive Guidance and Information). Finally, the paper reviews the basis for the final decision (in which DISCOVER was chosen). The system was installed at two of the college campuses in February, 1985, and will be reviewed in Spring, 1986. (KC)

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Selection of a Computerized Guidance System: A Review of DISCOVER and SIGI

by

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CE041609

A paper presented at the annual meeting of the American Educational Research Association, Chicago, Illinois, April 1, 1985.

Computers in Career Guidance

The ability of computers to store, organize, relate, search and retrieve large data files has made it a powerful tool in career counseling. Computers are not new to career development; they have been used for career guidance purposes in secondary and post-secondary schools since the 1960's. However, development of more sophisticated systems in the 1970's and the advent of microcomputers in the 1980's have made their use more widespread.

Development of computerized career information and guidance systems has gone through several stages. Super (1978) indicated the following four stages: (1) information storage and retrieval, (2) non-interactive person-college/job matching, (3) interactive person-college/job matching, and (4) exploration or guidance systems which engage in tasks which have traditionally been performed by a counselor, i.e. values clarification, decision making. In addition, the systems in the last category are capable of storing records for individual users. This capability allows for the use of pre-stored data (grade, interest, aptitude) and personalization--calling the user by name, or calling the user's attention to inconsistencies in decision making (Clyde, 1979).

This paper will review the process of selection of a computerized guidance system for a multi-campus, heterogeneous college. The paper will attempt to: (1) describe the criteria for selecting a career guidance program appropriate for a particular student population, (2) describe the main features of the two systems considered--DISCOVER and SIGI, and (3) will review the basis for the final decision. Later in the program, the two systems will be compared and evaluated.

Student Population

The College is a multi-campus institution with two main campuses, one in a large metropolitan area and the other in a suburban setting. The primary mission of the college is to offer career education to its heterogeneous student body. The College offers Associate, Bachelor's and Graduate degrees in career-related areas. The majority of the College's 14,000 students is first generation college students, and represents different nationalities and ethnic backgrounds. At least one-third of the entering student population receives remedial help in either English or Math, or both. The average SAT score for the above group is 376 for Verbal and 396 for Math. In addition, approximately 45% of all students receive remedial help in English.

Application of the system

The functions of the Office of Career Development include counseling undecided students, testing, teaching career related programs (including a 3 credit course), and assisting graduating students to prepare for employment, resume writing and interviewing skills. The OCD staff at the Metropolitan campus consists of one full-time and one half-time professional counselors and two half-time student aides. The office serves approximately 2,000 students. The system will be used both as a tool in individual and group counseling and as a career information resource. Attempts were made to select a system which would provide opportunity for work related self-exploration, occupational information, and teach rational decision making. After the initial research, it was decided that a career guidance system as opposed to a career information system would best meet the needs of OCD and the student population it serves. SIGI and DISCOVER were selected for further consideration. Both these systems have been evaluated as career guidance systems (Clyde 1979, Super 1978).

DISCOVER was developed by Joanne Harris-Bowlsbey in 1976 and is marketed by ACT DISCOVER Center. DISCOVER is based on a developmental approach to career guidance and utilizes Super's life stages theory (1963) and Tiedman and O'Hara's decision making paradigm (1963).

System of Interactive Guidance and Information (SIGI) was developed in 1973 by Martin Katz and is marketed by Educational Testing Service. SIGI uses values clarification as the focal point of career decision-making. SIGI's six components are interrelated and each has two functions: (1) to organize and dispense information and (2) to teach a step in rational or planful decision-making process. Each system can be used as separate resource if the purpose is information gathering. However, a system cannot be removed out of context when the purpose is to learn decision-making (SIGI manual, 1983).

Selection criteria

Contents

- To provide opportunity for multi-dimensional self-exploration - Interests, Values and Abilities.
- clude adequate occupational data base.
- Allow for multiple occupational searches.

Internal Structure

- To provide flexibility in allowing for movement from one component to another.
- Reading level must be appropriate for the student population (see P.1). Instruction must be easy to understand and follow.
- The amount of time required to complete the program should not exceed 3 to 4 hours (2 to 3 sessions).

Hardware and Cost

- What is the cost? Does the system run on most major hardware and their compatibles?

Training and Support

- Is the training material adequate? Is technical support available to users?

Contents Requirement

Multi-dimensionalSelf-exploration

DISCOVER

Part 1 of DISCOVER provides opportunity for self-exploration and consists of the following sections:

Interest Inventory

The interest inventory used by DISCOVER is the unisex edition of the ACT Interest Inventory (UNIACT). This inventory which was developed by the American College Testing Program consists of 90 items and takes about 15 minutes to complete. UNIACT is based on Holland's (1973) Occupational Typology Theory. It provides six 15-item scales that correspond to Holland's six interest types. Upon the completion of the inventory, the computer scores and interprets the results in two ways. The first interpretation reflects the results as a region in the World of Work Map (will be discussed later). The reported region indicates the user's interest in working with people or things and data or ideas. After the user enters the desired educational level (choices range from high school to graduate level), the program provides a list of occupations based on his/her responses to the UNIACT. The program also interprets the results as a bar graph indicating the student's scores on six occupational scales which will be discussed later.

Abilities

The Ability section includes a 14 item inventory which requires the user to rate himself/herself on each item on a scale of 1 to 5. After the completion of this section, the user may obtain a list of occupations based on his/her self-rating of abilities. The program also interprets the result as a region in the World of Work Map.

Values

DISCOVER's Inventory of Values is based on Super's international study of Work Importance (DISCOVER Manual, 1984). The inventory includes 16 items, and each item is rated on a scale of 1 to 5. After selection of an occupational level, the user may obtain a list of occupations for all the values rated 4 and 5 (quite or very important). In addition, the user may enter one value at a time (starting with the one of highest importance to him/her) and obtain a report on the number of potential occupations which would satisfy that value alone and in combination with the previously selected values.

SIGI

Values

The values component of SIGI provides an opportunity for self-exploration based on one's values. As defined by SIGI, values are "rewards and satisfactions" that are important to an individual in his/her choice of occupation. The purpose of this section is to introduce the user to work values and assist him/her in the clarification of these values. The ten occupational values included in the system are High Income, Prestige, Independence, Helping Others, Security, Variety, Leadership, Work in One's Field of Interest (includes six areas), Leisure, and Early Entry.

The results of a Pilot study of SIGI indicated that students found the ten values incorported in SIGI as adequate (Chapman,Norris, and Katz, 1973). Sampson, Stripling and Pyle (1978) found no significant differences between the value profiles in the Midwest, Southwest and Southeast. However, there have been no studies on the influence of nationality, race and sociceconomic status on the individual's value preferences.

SIGI acknowledges that the above list does not include all occupational values. For example, the inclusion of values which can be defined in more than one way (i.e. creativity) is avoided. All SIGI's values meet the following criteria: 1) they are relatively independent, and (2) they are related to occupational information and provide a means by which SIGI's occupations are differentiated.

All values are presented in a positive way and the user is asked to rate them on a scale of 0 to 8. In order to encourage further clarification of values, the user plays a game in which he/she will have to choose between imaginary jobs featuring 2 values at a time. Finally, SIGI will ask the user to re-weigh his/her values so that the total weight is 40. The purpose of this restriction is to force the user to probe more deeply into the relative importance of his/her selected values.

System meeting the requirement: DISCOVER

Occupational and Educational Data Base

DISCOVER:

The occupational data base of DISCOVER consists of 425 occupational titles which cover more than 95% if the U.S. labor force. These occupations are organized according to ACT occupational classification system (ACT-OCS). The occupational descriptions cover all areas stipulated in the National Vocational Guidance Association (NVGA) and the National Occupational Information Coordinating Committee (NOICC) guidelines. New materials related to each occupation are obtained from the Bureau of Labor Statistics, professional organizations, and government agencies. Occupational information presented in Part 3 of DISCOVER includes two sections: 1) Browsing gives an overview of each occupation's work tasks and settings, and 2) Detail provides information about any of the 425 occupations in DISCOVER's data file. The user may select occupations from his/her previous searches or use a code number for a specific occupation listed in the User Guide. Information related to salary and employment outlook is updated annually. Other information is updated on a three year cycle.

Part 4 of DISCOVER includes national data files of 1,800 four-year institutions, 1,500 two-year institutions, and 1,200 graduate and professional schools. Each category consists of several sub-categories. The self-reported data is collected by the American College Testing Program annually. The current responses to ACT's survey by college is reported to be 97% (DISCOVER Manual, 1984). Information about a particular institution is removed from the file when data becomes two years old and the institution has not provided new data. Furthermore, customer's sites have the option (by using a utility program) to use any or all of the above files.

SIGI:

SIGI's Occupational information is based on the DOT, the Occupational Outlook Handbook published by the U.S. Department of Labor, commercially prepared occupational briefs, sociological and psychological studies of occupations, and survey studies conducted by professional associations and government agencies (SIGI Manual, 1984). SIGI's educational data file includes national information. When available, localized data is provided by the college itself.

System meeting the requirement: DISCOVER/SIGI

Does The Program Relate Self-information To Occupational Information?

DISCOVER has utilized ACT's World of Work Map developed by Prediger (1976, 1981a, 1981b) as a basis for occupational exploration. The purpose of using the World of Work Map is twofold: to provide the student with an overview of the work world and to help students to view and relate their interests, competencies and values in world of work terms. Occupational Classification System (ACT-OCS) is used to provide the overall structure for organizing occupations in DISCOVER. This classification is also used in ACT's Career Planning Program, ACT Assesment (the ACT), and Vocational Interest Experience and Skill Assessment (VIES). ACT-OCS was based on the analyses of 13,800 occupations identified in the Third Edition of the ODT and the interest scores for 110,000 persons in 570 occupational groups. The results indicated a bipolar dimension. Occupations with high involvement with people tend to have a low level of involvement with things and vice versa. The same analogy can be applied to data/idea occupations. The results of a more recent study (Prediger,1981a) which used the data from the Fourth Edition of DOT confirms the earlier findings.

The data from the student's self-exploration (interest, abilities, and values) is translated into a region in the World of Work Map. The twelve regions on the map are designed to reflect different variations of four work dimensions. The self-exploration data is also interpreted on the basis of the user's score on the six occupational scales. These scales are similar to Holland's (1973) and Roe's (1956, 1969) classification and include:

BUSINESS CONTACT, Enterprising (Holland), Business Contact (Roe)

BUSINESS OPERATION, Conventional (Holland), Organization (Roe)

TECHNICAL, Realistic (Holland), Technical and Outdoor (Roe)

SCIENCE, Investigative (Holland), Science (Roe)

ARTS, Artistic (Holland), Arts and Entertainment (Roe)

SOCIAL SERVICE, Social (Holland), Service (Roe)

SIGI

Locate:
The purpose of this system is to identify occupations which may satisfy some of the user's values. The user selects 5 values at a time (system suggests values with highest rating) and indicates his/her minimum specification level for each value. Based on the user's specifications of the five selected values, the system provides a list of occupations for further consideration. This list can be varied by manipulating values and specifications. Furthermore, to find out why a particular occupation was not retrieved by SIGI, the user may enter the number of occupations of his/her choice and SIGI will respond which specification(s) it failed to meet.

Compare:
This system provides information about each occupation the user retrieved through Locate (or occupations of his/her choice selected from SIGI's occupational list, or mixture of both). The user must select 3 occupations at a time for each Compare run. Upon the selection of the 3 occupations, the system displays a list of 28 questions which the user may ask concerning the selected occupations. Up to 5 questions may be pre-selected at a time. When all the pre-selected questions are answered, the user may select another set of questions for the original set of occupations, or he/she may choose a new set of 3 occupations, or may exit from Compare.

Prediction:
The purpose of this system is to calculate the probability that the user will get a grade of A, B, C, or below C, in a local program. The probability will be reported as "chances in 100" of getting a particular grade.

The regression equation for SIGI prediction is based on the best combination of predictor variables collected through previous searches.

Planning:
The purpose of this system is to inform the user of specific requirements for preparing for each occupation. The system provides information related to the amount of education required to prepare for a particular occupation, a specific program of study which would prepare the user for entry into the occupation, and study outline of typical courses in each program. Planning may be tailored to include local information and therefore its contents may vary from institution to institution.

Strategy:
This system synthesizes the information gathered in previous sections. It offers a method for combining reward "opportunities to satisfy values" with risks "the uncertainty of completing all the steps for entry." The emphasis in this section is placed upon the method rather than the results (SIGI Manual, 1983). Based on the assessment of the professional in the field, each occupation in SIGI data file has a rating for each of the SIGI's 10 values. These ratings indicate to what degree a particular occupation can satisfy a particular value. The sum of the products of the user's rating for each value and a particular occupation's rating on that value is called "Desirability Sum." Risk, or the uncertainty of completing all steps, is measured on the basis of the student's own estimate. Then the desirability sum for each occupation is examined together with the chances (in 100) of successfully completing all required steps and entering into a particular occupation.

System meeting the requirement: DISCOVER/SIGI

Does The System Allow For Multiple Searches?

DISCOVER

Part 2 of Discover allows for occupational searches by:

- Interest Inventory Scores from UNIACT, Self-Directed Search Strong Campbell Interest Inventory, Ohio Vocational Interest Survey I or II or Kuder E.
- Aptitude Scores from instruments taken on paper, DAT, GATB, ASVAB, CPP.
- Selected Job Characteristics:
  The user may select any or a combination of up to 10 variables and get a list of occupations which would meet his special requirements. Each time the user enters a variable, the system generates the number and a list of

occupations that would meet that particular requirement alone and in combination with all other previously selected variables.

- Major Program of Study: This search strategy will allow the student to search the occupation by high school, community college, four-year college and graduate school majors. A list of majors and their code numbers for each of the above categories is provided in the User Guide.

The college file in Part 4 may be searched by either entering the code number of a specific college from the User Guide or by a combination of the following variables: major, cost, size of enrollment, location, admission policies, control or affiliation, type of community, minority representation, sex ratio, and special features.

SIGI

The user may search the occupational data file via completing values section or entering the code from SIGI data file.

System meeting the requirement: DISCOVER

Internal Structure

Provide Flexibility In Movement From One Component To Another

DISCOVER:
The user may access any modules of the DISCOVER system and easily move from one section to another.

SIGI:
The system requires that the first time users "novices" to go through the entire system at least once. "initiates", those who have completed all the sections, may have access to different modules in any order they wish.

System meeting the requirement: DISCOVER

The Amount Of Time Required To Complete The Program:

DISCOVER:
It was estimated that it would take the average user of this specific student population three to four hours to complete the program.

SIGI:
The amount of time required to complete SIGI was estimated to be four to five hours for the average user.

System meeting the requirement: DISCOVER

Reading Level And Ease Of Use

DISCOVER:
Reading level is reported to be 7th and 8th grade level except for the occupational section. The instructions are relatively clear and easy to follow. Assistance of a clerical staff is recommended.

SIGI:
Reading level is reported to be suitable for 7th and 8th grades. However, based on the counselors' judgement, the program is too textual for the student population under consideration. Instructions are relatively difficult to follow; assistance of a clerical staff is highly recommended.

System meeting the requirement: DISCOVER

HARDWARE AND COST

SIGI and DISCOVER are available for a wide variety of microcomputers. Both systems run on hardware available to the Office of Career Development.
DISCOVER costs $1,750 for the first set and $1,500 for each additional set. SIGI costs $900 for the first set and $600 for each additional set.

System meeting the requirement: DISCOVER/SIGI

TRAINING AND SUPPORT

DISCOVER
The system provides the following training materials and support systems:
- Professional Manual
- The User Guide
- Training Tape (costs an additional $75 for purchase and $25 for rental)
- Instructions on how to set the system up (at this time not adequate for Rainbow 100)
- Newsletter and regional conference

SIGI

Training materials and support systems indlude:

- Counselor's Handbook, comprehensive, a step by step guide on how to counsel students using the system.
- Manager's Guide, describes how to access and use SIGI.
- SIGI Crosswalk, provides cross reference to numbers used in the DOT, SOC and the occupational outlook Handbook.
- Occupation List, list of occupations and their number in SIGI's data file.
- Newsletter and annual conferences.

System meeting requirement: DISCOVER/SIGI

Basis for Selection of the Program

The final decision for the selection of the software was based on the feedback from counselors and selected faculty members from the Department of General Studies (which includes students who do not meet the minimum academic requirement for a particualr major and those who are undecided). All staff had previous exposure to SIGI*. Two on-site demonstrations of DISCOVER were arranged during the Spring 1984 semester. It was generally agreed by the staff that DISCOVER would be a more appropriate system for the student population. DISCOVER was installed at two of the college campuses in February 1985. The system will be evaluated in Spring 1986, and the results will be reported in Part 11 of this report.

* The college used the main frame version of SIGI on a limited basis for about a year. When it was decided to change to microcomputers, other systems were explored.

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